The Crucible Discharge Method for Making Measurements of the Physical Properties of Melts: an Overview

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The physicochemical properties, viscosity, density and surface tension, were measured using the Crucible Discharge method (CD) on a wide range of pure melts and alloys and for AZ91D in two gas atmospheres. The CD method was confirmed on pure metals Sb, Sn, Zn and compared with the corresponding literature data. The results reported for Sb-Sn alloys containing 10, 20, 25, 50 and 75 percent Sb at 550K to 850K, for Sn-Ag alloys containing (3.8, 32, 55, and 68) percent Ag for commercially pure Al and for AZ91D Mg alloy under an argon atmosphere. The properties for AZ91D were also measured under an atmosphere of air containing 2% SF_6. The results are compared with published data on all alloys. The experimentally measured surface tension values are compared with the Butler model. Several models for viscosity are compared and discussed with regard to the viscosity measurements.